MT PRIME

Appendix F

Detailed Descriptions of Alternatives

Deloitte & Touche Consulting Group

1. Year 2000 Fix

Minimal programming to fix the current suite of mainframe applications for issues such as Year 2000 compliance but leaving functionality essentially the same.

Dimensions	Option
Application Functionality	CURRENT
Application Distribution	CENTRAL
Application Architecture	MAINFRAME
Data Architecture	CENTRALIZED
Database Environment	FLAT/NETWORK
Hardware Environment	MAINFRAME
Workstation Environment	TERMINALS/PCs
Network Environment	SNA/CURRENT
Solution Type	ENTERPRISE
Acquisition Method	BUILD ALL
Implementation Method	INSOURCE
Support Method	INSOURCE

- Maintain current technical environment
  - Keep the existing mainframe environment with access through terminals and terminal emulators
- Address Year 2000 issues
  - Functionality of the core systems would remain the same as it is now
  - Year 2000 compliance would be achieved by using internal programmers as much as possible, hiring external resources only when necessary

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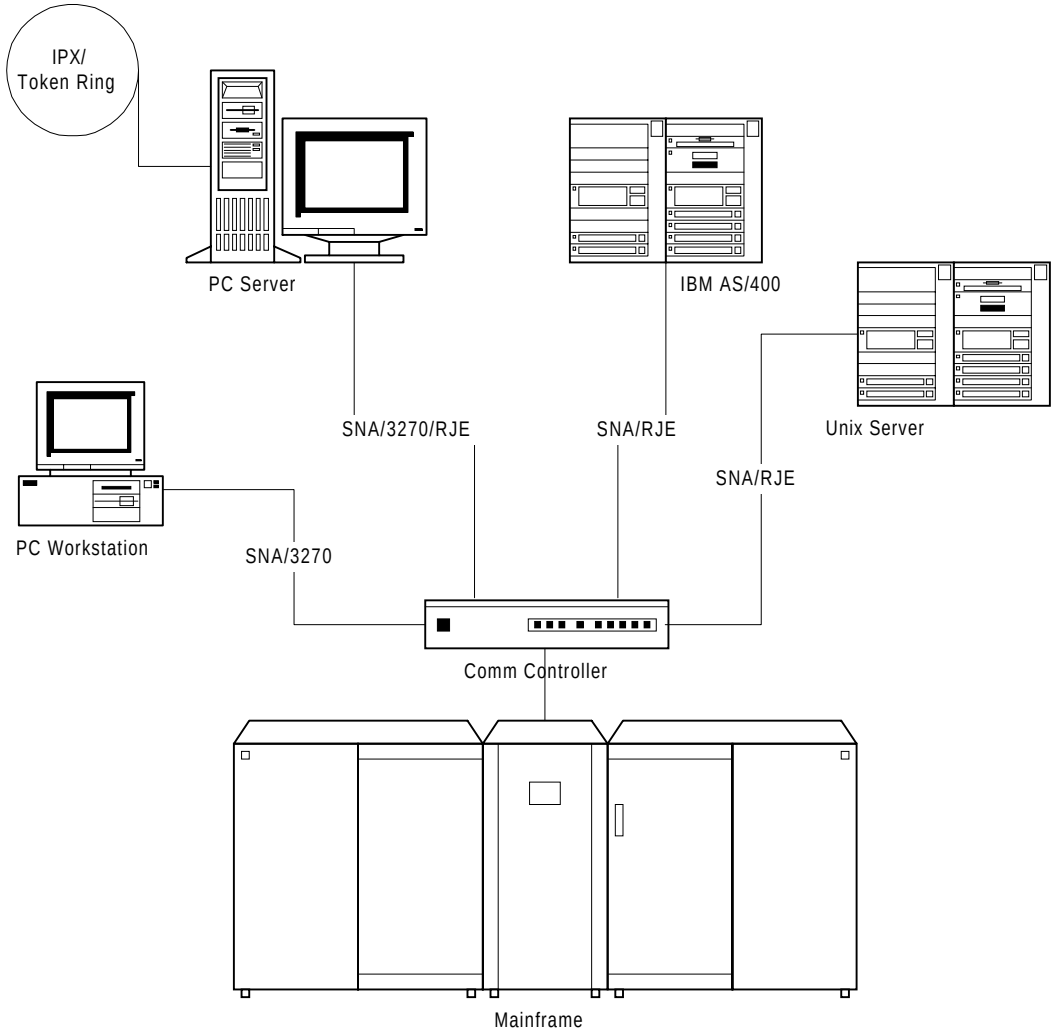
1. Year 2000 Fix
TECHNICAL ARCHITECTURE

- Mainframe-centric
  - proprietary
  - SNA
  - 3270 terminals and terminal emulation
- Year 2000 Improvements
  - modifications to existing cobol programs
- Agency Status Quo
  - agencies will continue to develop functional solutions
- No significant process improvements



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1. Year 2000 Fix: EVALUATION

Criteria	Considerations	Score	Weight	Total
Functionality	- agencies cannot manage their businesses utilizing these systems - not in line with IM Principles and business directions -least functional of all the alternatives	**3**	17	51
Accessibility	- mainframe foundation precludes easy, widespread access - public access is absent and not easily achieved - agency managers can access from home in terminal emulation mode	**4**	15	60
Operations	- efficient mainframe operation - long-term costs of ongoing maintenance will rise - performance over time is good	**4**	10	40
Technical Merit	- lack of compliance with open standards - can't support diverse technology base easily - not compliant with database directions	**2**	8	16
Implementation Cost	- lowest implentation cost - ability to implement with existing (low cost) resources	**9**	10	90
Risk	- automated tools will give significant assistance - existing expertise is in-place for modifications	**8**	15	120
Timing	- timing is achievable	**7**	15	105
Ability to Implement	- available resources are geared to this task - analysis of this effort is ongoing in ISD - specific costs will be subsequently available	**8**	10	80
			FINAL SCORE:	**562**

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1. Year 2000 Fix : PRICING

Technology Pricing

(in thousands)

		Assumptions
Modules	$0	
Maintenance	0	
Hardware	0	
Workstations	0	
Other Licences	50	Tools to identify Y2K issues
Coding Changes	0	
Tech Subtotal	$50	

People Pricing

(in thousands)

		Assumptions
Conversion Team	$0	
Process Change	0	
Product Specialist	0	
Tools Specialists	672	8 ISD staff, 1 year, $42/hr.
Additional Resources	134	20% of specialist costs
Project Management	101	15% of specialist costs
Expenses	0	
People Subtotal	$907	

TOTAL COST: $957

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2. Data Warehouse Construction

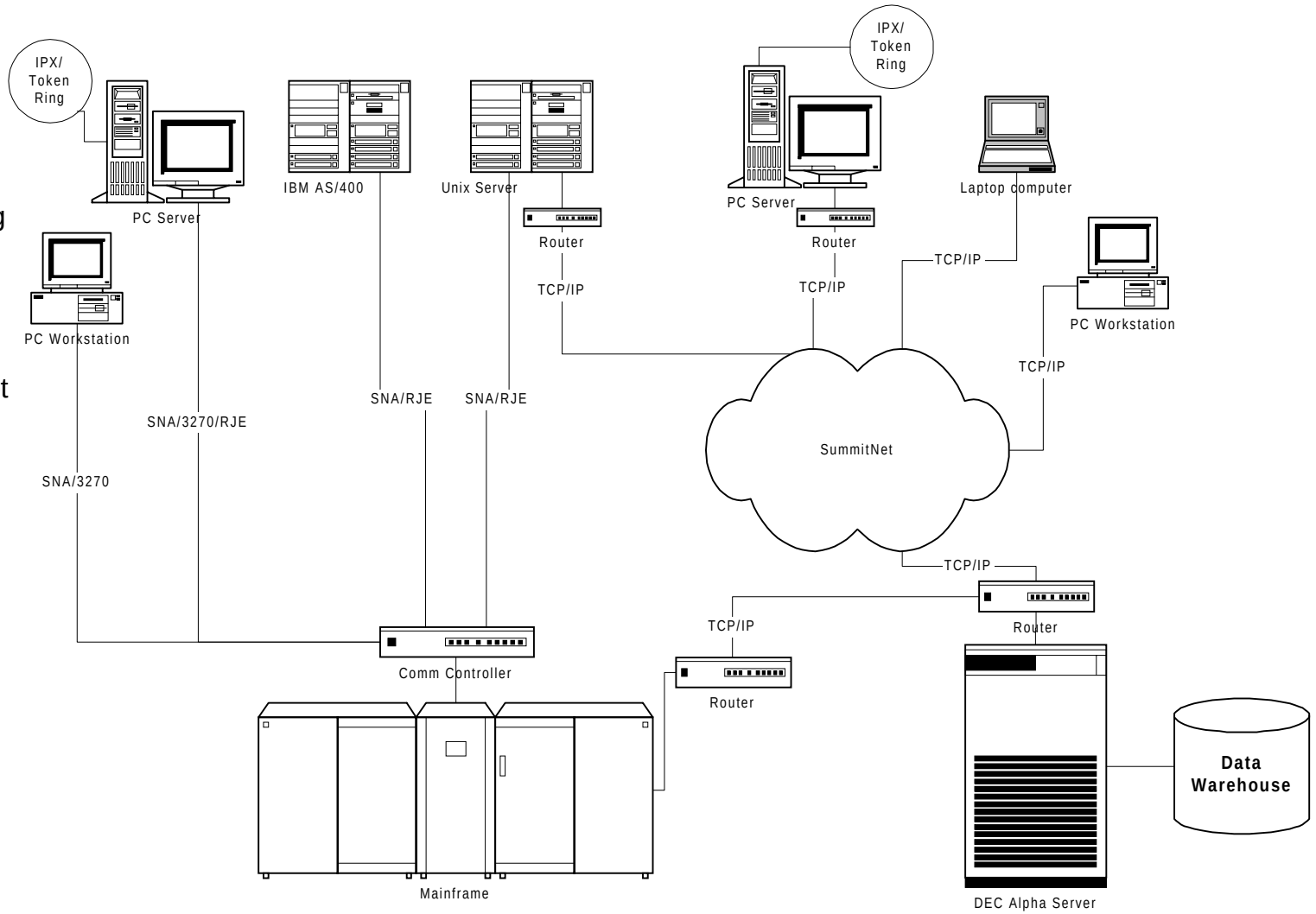
Keep the current suite of applications, repairing them so they will function past the Year 2000, but add a data warehouse to augment reporting capabilities.

Dimensions	Option
Application Functionality	CURRENT
Application Distribution	CENTRAL
Application Architecture	MAINFRAME +QUERY SERVER
Data Architecture	DATA WAREHOUSE
Database Environment	RELATIONAL
Hardware Environment	SINGLE SERVER
Workstation Environment	PCs/TERMINALS/ TERMINAL EMULATION
Network Environment	SUMMITNET
Solution Type	ENTERPRISE
Acquisition Method	BUILD/BUY
Implementation Method	COSOURCE
Support Method	COSOURCE

- Address Year 2000 issues
  - Minimal programming effort to achieve Year 2000 compliance
  - In order to better meet the business needs of state agencies, supplementary reporting capabilities would be added to the existing systems, perhaps in the form of a data warehouse
- Implement a query server
  - Queries and reporting might be achieved through an intranet running on the SummitNet network
  - The query server would collect data from the mainframe, link it relationally, then serve as a web server for reporting purposes
  - Keep the existing mainframe environment with access through terminals and terminal emulators for data input to underlying mainframe systems
- Implement a data warehouse
  - Data warehouse might be constructed internally from scratch or through the purchase and implementation of a warehousing package

2. Data Warehouse Construction
TECHNICAL ARCHITECTURE

- Data warehouse
  - improved reporting and decision support
- Networking
  - Utilizes SummitNet for warehouse inquiry
- No significant process improvements



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2. Data Warehouse Construction: EVALUATION

Criteria	Considerations	Score	Weight	Total
Functionality	- current functional deficiencies will still exist - data warehouse will address some reporting needs	**4**	17	68
Accessibility	- still doesn't meet the need for shared, common systems - improves the consistency of data	**6**	15	90
Operations	- same characteristics as the mainframe but more complex	**3**	10	30
Technical Merit	- slightly higher than the status quo - mapping the mainframe databases to warehouse is a complex task - can be considerable effort to maintain the link between warehouse and databases	**3**	8	24
Implementation Cost	- warehouse server costs - warehouse tool costs - significant project management effort	**6**	10	60
Risk	- in-house Oracle resources will not have warehousing experience - considerable technical risk, less than a new construction	**6**	15	90
Timing	- unknowns that could influence timing - year 2000 would still be highest priority - warehousing team would have to be coordinated with Year 2000 team	**6**	15	90
Ability to Implement	- half the job will be appropriate resources - warehousing experience and resources are not in place - resources to do both Year 2000 and new functionality	**6**	10	60
		FINAL SCORE:		**512**

2. Data Warehouse Construction: PRICING

Technology Pricing

(in thousands)

		Assumptions
Modules	$0	
Maintenance	0	
Hardware	500	hardware cost for server dedicated to warehouse
Workstations	0	
Other Licences	450	Oracle license for server
Coding Changes	0	
Tech Subtotal	$950	

People Pricing

(in thousands)

		Assumptions
Conversion Team	$0	
Process Change	0	
Product Specialist	900	3 contractors, 9 months, $200/hr.
Tools Specialists	1,404	8 ISD staff, 9 months, $42/hr.; 4 contractors, 9 months, $150/hr.
Additional Resources	461	20% of specialist costs
Project Management	461	20% of specialist costs
Expenses	180	20% of product specialist costs
People Subtotal	$3,406	
	0	
TOTAL COST:	$4,356	

3. Client-Server Construction

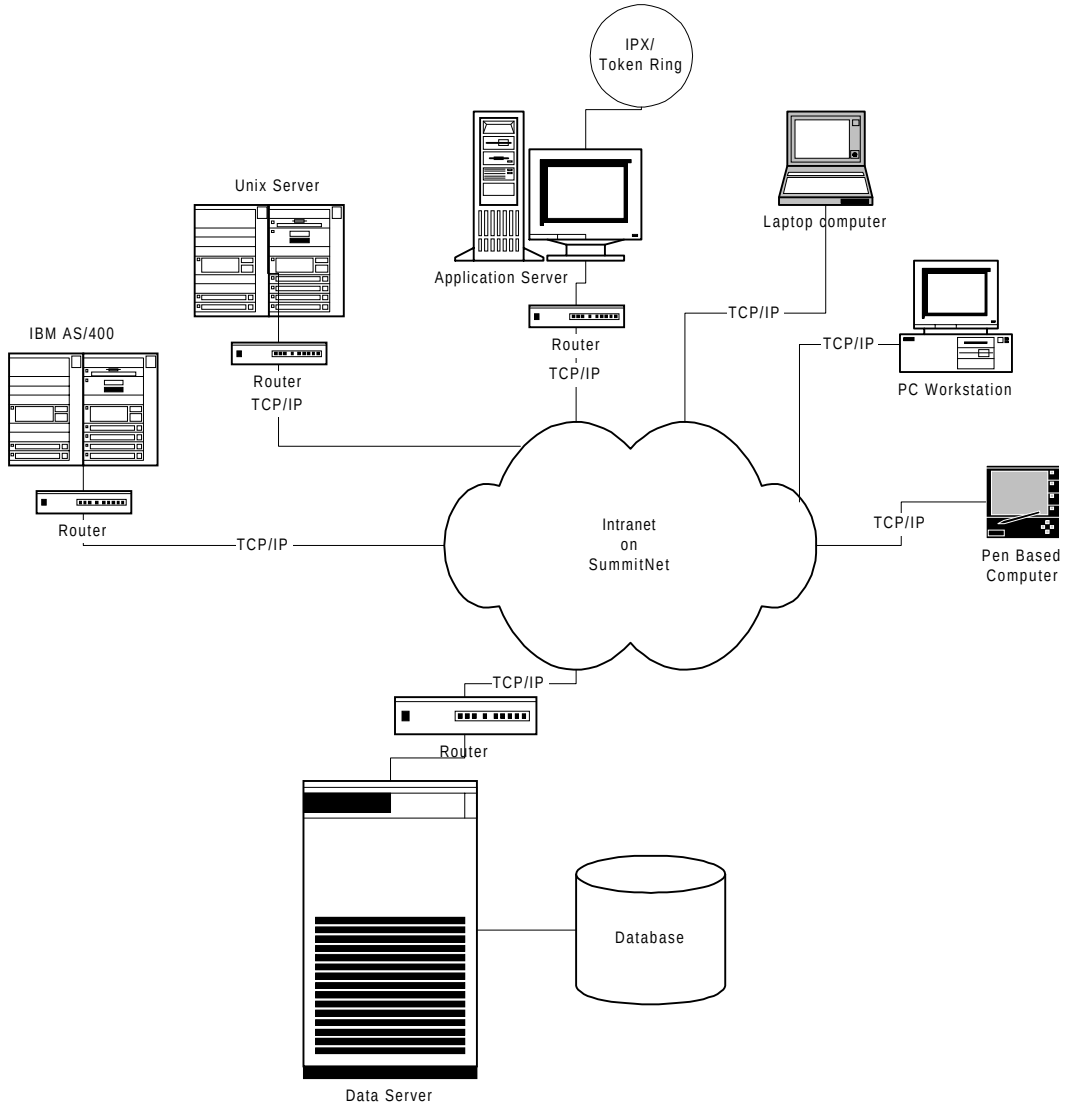
Create a new suite of core applications using modern technologies. For example, designing new applications in-house on an Oracle platform.

Dimensions	Option
Application Functionality	EXPANDED
Application Distribution	DISTRIBUTED
Application Architecture	CLIENT-SERVER
Data Architecture	DISTRIBUTED or CENTRAL
Database Environment	RELATIONAL
Hardware Environment	OPEN SERVER
Workstation Environment	PCs +
Network Environment	SUMMITNET/ INTRANET
Solution Type	ENTERPRISE
Acquisition Method	BUILD ALL
Implementation Method	COSOURCE
Support Method	COSOURCE

- Build custom functionality
  - Applications would be custom designed to meet state needs
- Build a new client-server environment
  - Applications would be designed around client-server technology
  - Applications would most likely be distributed so that desktop PCs are bearing some of the processing load for queries
  - A relational database would support a centralized data architecture
- Design an enterprise solution
  - System would be enterprise-wide, accessible through SummitNet
- Build and support with internal and external resources
  - Systems would have to be built and supported with internal or external resources who have experience with client-server technology

3. Client-Server Construction
TECHNICAL ARCHITECTURE

- Client-Server
  - designed to make use of PC (client) capabilities
  - application code distributed as appropriate
  - data distributed as appropriate
- SummitNet-centric
  - uses existing network infrastructure, potentially in an intranet structure
- Large investment
  - development resources
  - development tools
- High Risk
  - development from scratch is always risky



MT PRIME 3. Client-Server Construction: EVALUATION

Criteria	Considerations	Score	Weight	Total
Functionality	- highest functionality given present technology due to custom design - similar functionality to emerging technology without new enablers	**9**	17	153
Accessibility	- highly accessible through standard desktop PC - customized access for users - access may not include web-based access	**9**	15	135
Operations	- onging operational maintenance costs - upgrade will be more difficult if built in-house - maintenance will have to be custom because system is proprietary	**5**	10	50
Technical Merit	- ability to choose the most current and available technology	**9**	8	72
Implementation Cost	- custom work will be costly and done from scratch - second highest cost alternative	**2**	10	20
Risk	- development projects are very risky - highly distributed, cross organizational aspects increase unknowns	**3**	15	45
Timing	- successful, on time implementation is unlikely	**1**	15	15
Ability to Implement	- slightly more able to implement than emerging technologies	**2**	10	20
			FINAL SCORE:	**510**

MT PRIME 3. Client-Server Construction: PRICING

Technology Pricing
(in thousands)

Modules	$0
Maintenance	0
Hardware	2,500
Workstations	1,500
Other Licences	1,000
Coding Changes	0
Tech Subtotal	$5,000

Assumptions

hardware cost for enterprise server, development server
cost for new workstations to operate advanced applications development environment tools

People Pricing
(in thousands)

Conversion Team	$408
Process Change	1,000
Product Specialist	0
Tools Specialists	13,200
Additional Resources	2,640
Project Management	3,300
Expenses	3,300
People Subtotal	$23,848

Assumptions

20 interfaces in, 6 weeks each, $70/hr.; 20 interfaces out, 1 week, $70/hr.
initial investment for process reengineering

20 contractors, 2 years, $150/hr., plus data conversion
20% of tool specialist costs
25% of tool specialist costs
20% of tool specialist and project management costs

TOTAL COST: $28,848

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4. Emerging Technologies Construction

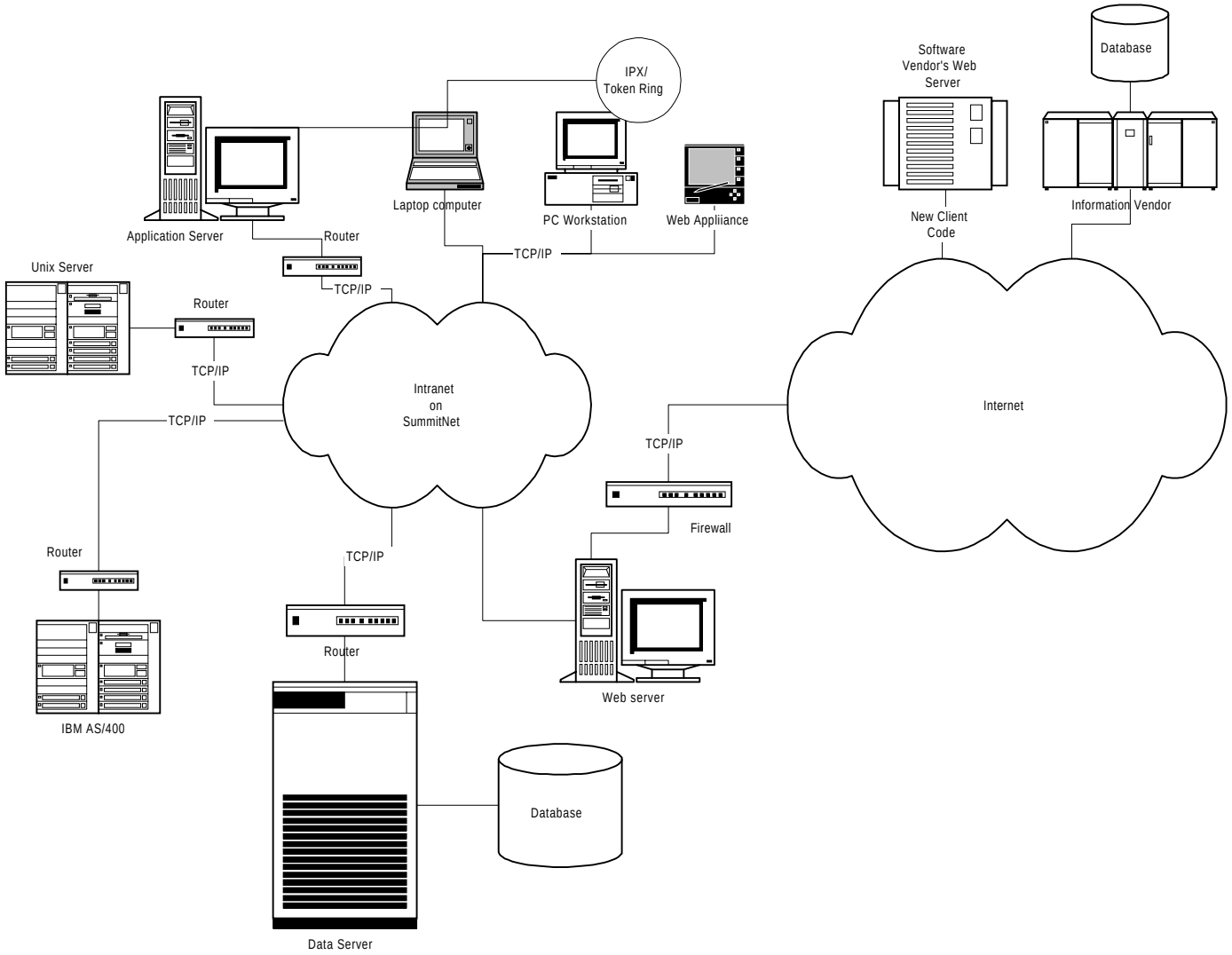
Creating new applications to leverage impending technological advances.

Dimensions	Option
Application Functionality	EXPANDED
Application Distribution	DISTRIBUTED/ CENTRALIZED
Application Architecture	OBJECT ORIENTED
Data Architecture	DISTRIBUTED/ CENTRALIZED
Database Environment	OBJECT ORIENTED
Hardware Environment	OPEN SERVER
Workstation Environment	OTHER
Network Environment	SUMMITNET
Solution Type	ENTERPRISE
Acquisition Method	BUILD ALL
Implementation Method	OUTSOURCE
Support Method	COSOURCE

- Plan and design for impending technology advances
  - Consider the State's information in light of new technologies
  - Build leading edge, custom systems in-house
- Custom build the solution
  - Emergening technologies require custom building
- Technology-driven functionality and process improvements
  - Functionality would be custom to the State's needs
  - Potential for a strong technological advantage during business process reengineering

4. Emerging Technologies Construction: TECHNICAL ARCHITECTURE

- Embedded Computing
  - away from the traditional PC model of a monitor, box and keyboard
  - TV set-top boxes
  - Smart houses
- Mobile Computing
  - tablet computers
  - PDAs
- Network-centric Computing
  - internet appliances
  - Java machines
- New application models
  - modular functionality
  - Java applets



4. Emerging Technologies Construction: EVALUATION

Criteria	Considerations	Score	Weight	Total
Functionality	- defined as best conceivable functional option - high-end hardware options including PDAs, java machines	**10**	17	170
Accessibility	- highest and best accessibility possible	**10**	15	150
Operations	- slightly higher efforts to maintain the high-end technology	**4**	10	40
Technical Merit	- standards will be nonexistant - will be very open-systems compliant - supports a diverse technology base by definition	**8**	8	64
Implementation Cost	- extremely high cost option given the uncertainty, lack of tools and experience	**1**	10	10
Risk	- extremely risky alternative, significant unknowns	**1**	15	15
Timing	- lack of established standards - tools will have to be rethought continually until standards are established - technology base is just beginning to emerge - market for the technology would be undeveloped	**1**	15	15
Ability to Implement	- significant external resources required	**1**	10	10
		FINAL SCORE:		**474**

4. Emerging Technologies Construction: PRICING

Technology Pricing

(in thousands)

		Assumptions
Modules	$0	
Maintenance	0	
Hardware	2,500	hardware cost for enterprise server, development server
Workstations	1,500	cost for new workstations to operate advanced applications
Other Licences	50	development environment tools
Coding Changes	0	
Tech Subtotal	$4,050	

People Pricing

(in thousands)

		Assumptions
Conversion Team	$408	20 interfaces in, 6 weeks each, $70/hr.; 20 interfaces out, 1 week, $70/hr.
Process Change	2,000	ongoing investment for process reengineering
Product Specialist	0	
Tools Specialists	22,000	25 contractors, 2 years, $200/hr., plus 10% data conversion
Additional Resources	4,400	20% of tool specialist costs
Project Management	5,500	25% of tool specialist costs
Expenses	5,500	20% of tool specialist and project management costs
People Subtotal	$39,808	

TOTAL COST: $43,858

5. Mainframe Construction

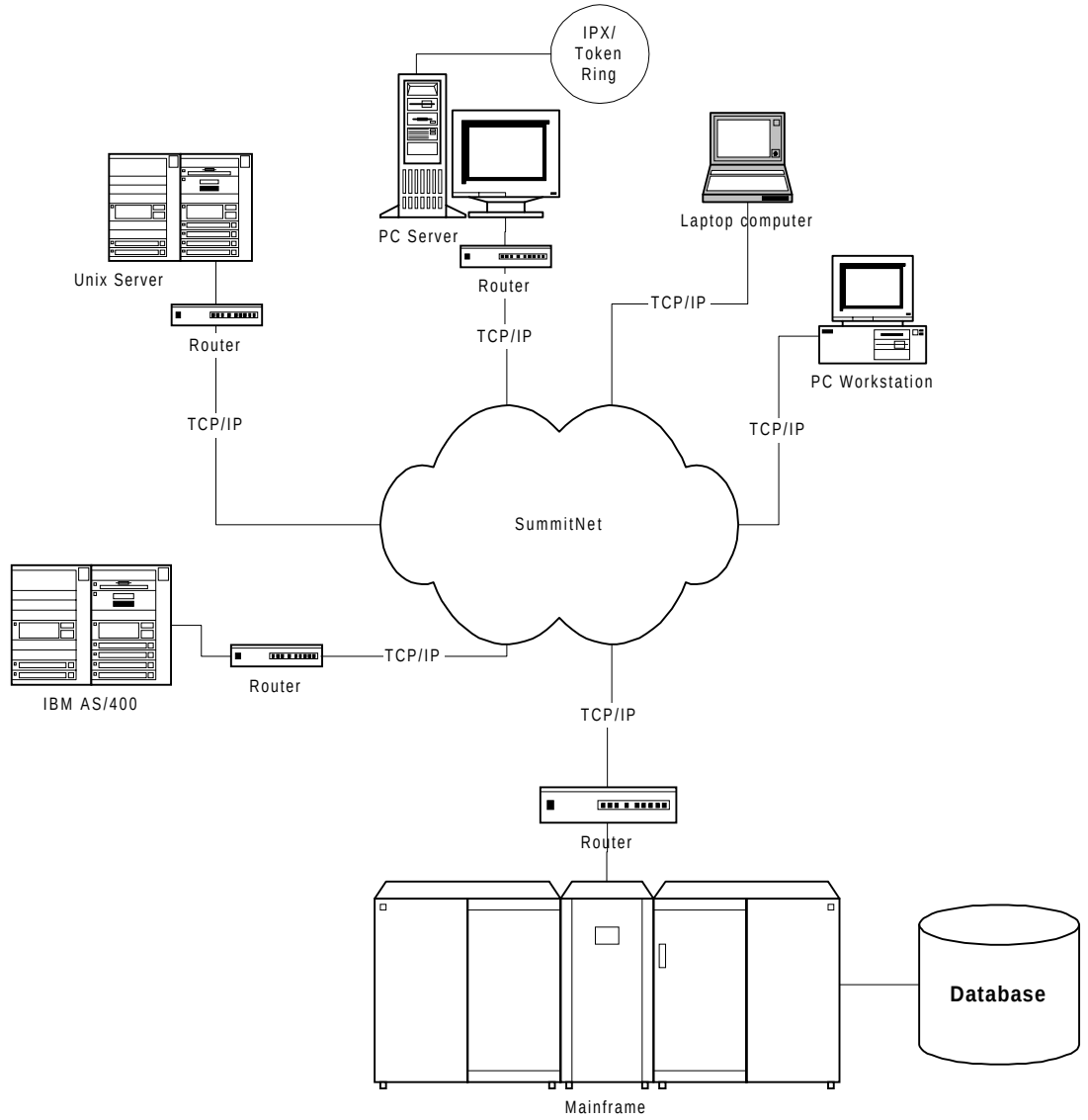
Build a new mainframe solution appropriate to the State's changing needs and business directions.

Dimensions	Option
Application Functionality	EXPANDED
Application Distribution	CENTRALIZED
Application Architecture	MAINFRAME
Data Architecture	CENTRALIZED
Database Environment	RELATIONAL
Hardware Environment	MAINFRAME
Workstation Environment	PCs/ TERMINALS
Network Environment	SUMMITNET
Solution Type	ENTERPRISE
Acquisition Method	BUILD
Implementation Method	COSOURCE
Support Method	COSOURCE

- Maintain current technical environment
  - Keep existing mainframe environment with access available through either terminals or PCs
  - No new hardware required
- Enhanced functionality
  - New functionality will be provided by software
- Reengineer as far as possible
  - Implementing new software will provide opportunity for process improvement
- Fast implementation
  - Implementation is accelerated since no additional additional hardware is required

5. Mainframe Construction: TECHNICAL ARCHITECTURE

- Mainframe becomes a data server
  - Oracle relational database running
- SummitNet-centric
  - TCP/IP used to ccmmunicate with mainframe
  - SummitNet is used to carry all networking traffic



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5. Mainframe Construction: EVALUATION

Criteria	Considerations	Score	Weight	Total
Functionality	- new functionality - not client-server	**8**	17	136
Accessibility	- access likely only by terminal emulation - lack of a graphical user interface	**7**	15	105
Operations	- efficient mainframe operation - ongoing maintenace is costly - performance over time is good	**5**	10	50
Technical Merit	- may be able to use Oracle database consistent with established standards - cannot support a diverse technology base	**5**	8	40
Implementation Cost	- uses existing technology base - no new hardware/network investment - custom design costs	**4**	10	40
Risk	- development projects are very risky	**4**	15	60
Timing	- successful, on-time implementation is unlikely	**1**	15	15
Ability to Implement	- resources are skilled in deploying mainframe applications	**3**	10	30
			FINAL SCORE:	**476**

5. Mainframe Construction: PRICING

Technology Pricing
(in thousands)

		Assumptions
Modules	$0	
Maintenance	0	
Hardware	0	
Workstations	0	
Other Licences	1,500	other licences for existing mainframe
Coding Changes	0	
Tech Subtotal	$1,500	

People Pricing
(in thousands)

		Assumptions
Conversion Team	$408	20 interfaces in, 6 weeks each, $70/hr.; 20 interfaces out, 1 week, $70/hr.
Process Change	1,000	initial investment for reengineering and visioning
Product Specialist	0	
Tools Specialists	9,900	20 contractors,1.5 years, $150/hr., plus 10% data conversion
Additional Resources	1,980	network people, database administrators
Project Management	2,475	25% of tools specialist costs
Expenses	2,475	20% of personnel costs
People Subtotal	$18,238	

TOTAL COST: $19,738

6. Multiple Package Purchase

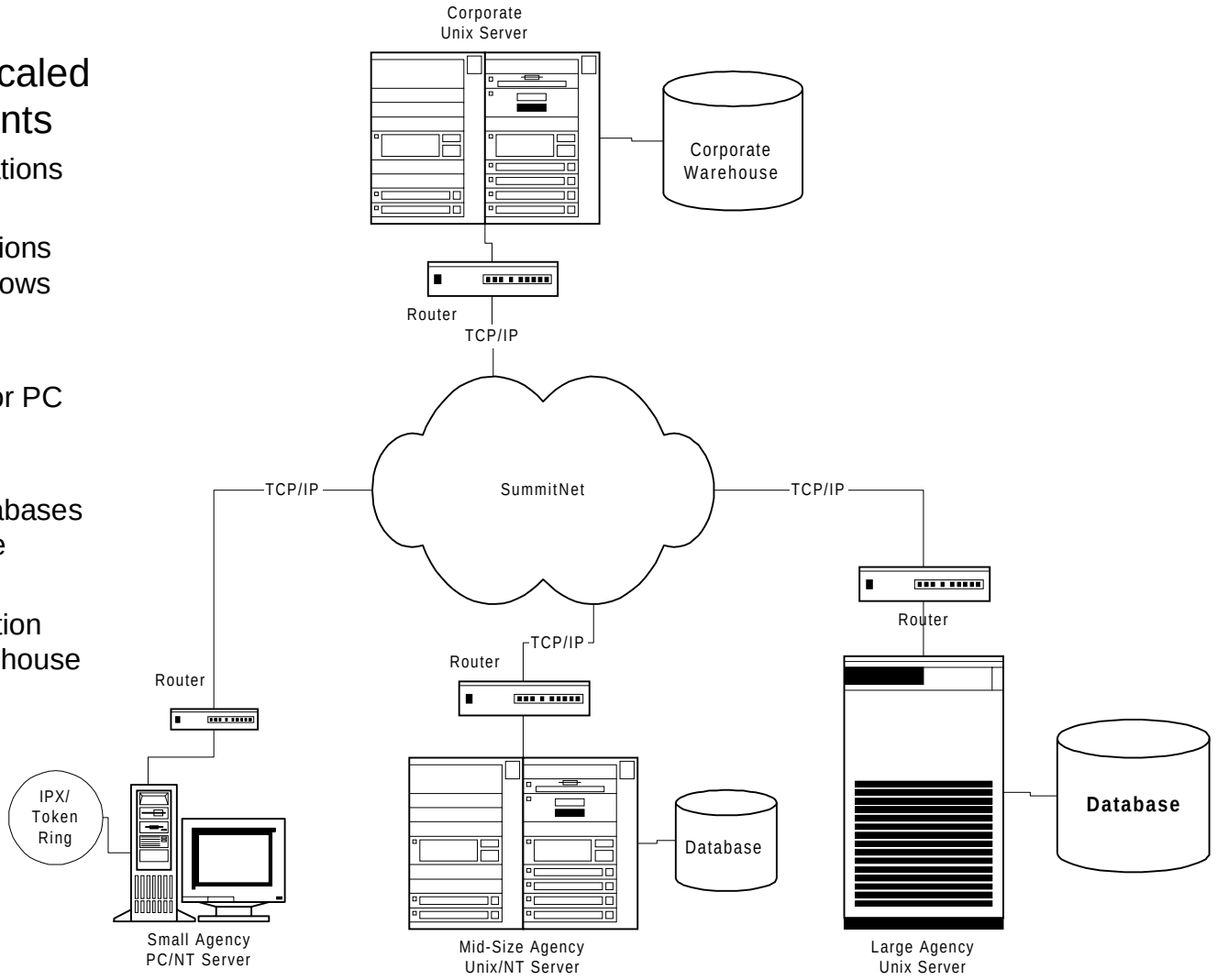
Purchase a number of packages which vary on some criteria such as scale (larger systems for larger agencies) or functionality (best of breed as required).

Dimensions	Option
Application Functionality	EXPANDED
Application Distribution	DISTRIBUTED
Application Architecture	CLIENT-SERVER
Data Architecture	DISTRIBUTED/ CENTRAL
Database Environment	RELATIONAL
Hardware Environment	OPEN SERVER
Workstation Environment	PCs
Network Environment	SUMMITNET
Solution Type	NARROW/BEST OF BREED
Acquisition Method	BUY ALL
Implementation Method	COSOURCE
Support Method	INSOURCE

- Scaled Functionality
  - Purchase a limited number of packages which attempt to cover the needs of all the agencies
  - Reduces need to find a package which is “one size fits all”
  - Criteria for choosing different packages might be the size of the agency or the functional requirements of the agency
- Integrate as required
  - Implement a limited warehouse or some centralized reporting facility to meet centralized reporting needs such as CAFRs
- Implement with available resources
  - Implementation teams might include internal and external technology staff as well as agency technology staff

6. Multiple Package Purchase: TECHNICAL ARCHITECTURE

- Technical architecture scaled to application requirements
  - Large, high-volume applications running on a mainframe
  - Medium sized implementations on a mid-size Unix or Windows NT server
  - Small implementations of software on a LAN server or PC
- Integration Effort
  - initial mapping agency databases to the corporate warehouse
  - each application upgrade requires additional integration effort at the corporate warehouse



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6. Multiple Package Purchase: EVALUATION

Criteria	Considerations	Score	Weight	Total
Functionality	- high functionality based on commercial availability - limited warehouse will sit on top of packages to report to legislators or to do a CAFR	**7**	17	119
Accessibility	- limited warehouse would provide increased accessibility - difficult to provide access to multiple packages - inter-agency access is difficult	**6**	15	90
Operations	- increased complexity - easy integration to operational systems - upgrades easier at agency level, more difficult at warehouse level	**3**	10	30
Technical Merit	- more technologically robust than Data Warehouse option - packages are likely to be open systems compliant	**6**	8	48
Implementation Cost	- depends on number of packages and integration effort - number of packages will impact number of servers	**4**	10	40
Risk	- significant integration difficulties create a risk of not meeting the goals of MT PRIME	**4**	15	60
Timing	- integration may cause delays	**3**	15	45
Ability to Implement	- agencies' capabilities are unclear	**2**	10	20
			FINAL SCORE:	**452**

6. Multiple Package Purchase: PRICING

Technology Pricing

(in thousands)

		Assumptions
Modules	$1,500	3 package solutions
Maintenance	150	10% of module costs
Hardware	2,500	hardware cost for enterprise server, development server
Workstations	1,500	planning budget for workstations is $3,000
Other Licences	2,500	Oracle licence for new server, and other licences
Coding Changes	0	
Tech Subtotal	$8,150	

People Pricing

(in thousands)

		Assumptions
Conversion Team	$408	20 interfaces in, 6 weeks each, $70/hr.; 20 interfaces out, 1 week, $70/hr.
Process Change	1,000	initial investment for reengineering and visioning
Product Specialist	4,620	14 contractors, 9 months, $200/hr., plus 10% data conversion
Tools Specialists	990	4 contractors, 9 months, $150/hr., plus 10% data conversion
Additional Resources	1,122	network people, database administrators
Project Management	1,403	25% of specialist costs
Expenses	1,403	20% of personnel costs
People Subtotal	$10,945	

TOTAL COST: $19,095

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7. Centralized Package Purchase

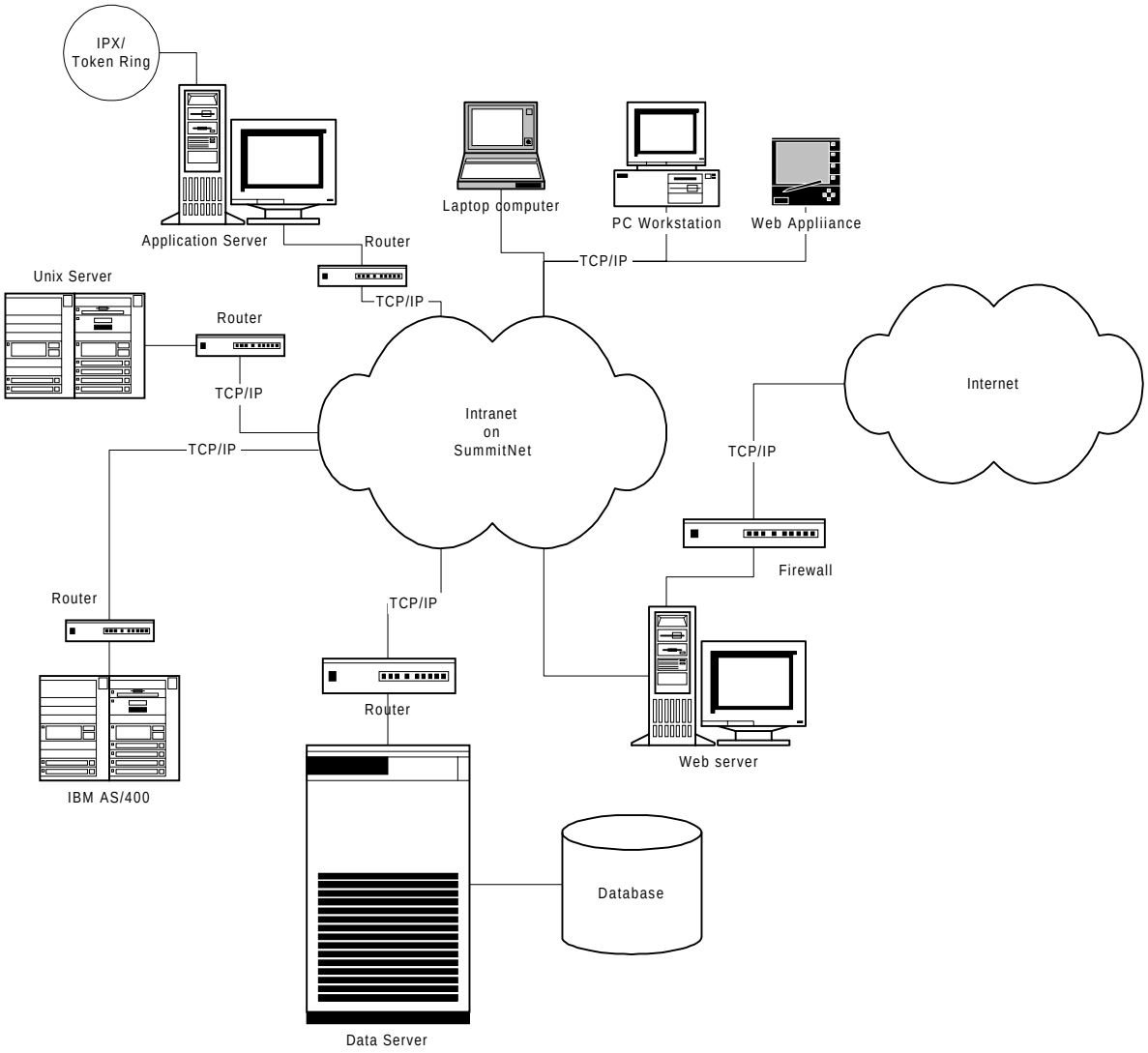
Buy a centralized software suite of integrated, enterprise-wide applications from a single vendor.

Dimensions	Option
Application Functionality	EXPANDED
Application Distribution	CENTRALIZED
Application Architecture	CLIENT-SERVER
Data Architecture	CENTRALIZED
Database Environment	RELATIONAL
Hardware Environment	OPEN SERVER
Workstation Environment	PCs
Network Environment	SUMMITNET
Solution Type	ENTERPRISE
Acquisition Method	BUY ALL
Implementation Method	COSOURCE
Support Method	INSOURCE

- Purchase commercial software
  - Upgrade potential
  - Limits risk of software not working at all
  - Track record of successful implementation
- Leading edge functionality
  - Top vendors are offering tremendous functionality at reasonable prices
  - Highly integrated to reduce data redundancy
  - Client-server construction makes use of the state's existing PC base
- Achievable process improvements
  - Best practices designed in the software make process improvements more readily accessible
  - The implementation process focuses on configuring the software for the user needs and business requirements, not on programming

7. Centralized Package Purchase: TECHNICAL ARCHITECTURE

- Client-server independent of hardware
  - server versions of the application can be run on any hardware that can be configured as a server (e.g. a mainframe).,
  - client versions of the application will depend on clients used
- Client-server architecture is flexible
  - data can be distributed as appropriate
  - application code can be distributed as appropriate
- SummitNet-centric network
  - TCP/IP protocol
  - open systems



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7. Centralized Package Purchase: EVALUATION

Criteria	Considerations	Score	Weight	Total
Functionality	- enterprise application affords functional advantages that can only be implemented through centralized systems	**8**	17	136
Accessibility	- distributed client server architecture will provide wide accessibility to desktop machines	**9**	15	135
Operations	- upgrades will be available from vendor	**10**	10	100
Technical Merit	- open systems compliant - high technical merit since the software is known to work effectively with a diverse technology base	**8**	8	64
Implementation Cost	- cost of configuring a large package is greater in the average case than integrating small, discrete solutions	**5**	10	50
Risk	- less risky since packages have been implemented elsewher	**7**	15	105
Timing	- no year 2000 issues since its taken care of - some timing risk	**6**	15	90
Ability to Implement	- can use state resources on client teams - available - central package conducive to centralized government model - uses mostly off-the-shelf technology components	**6**	10	60
			FINAL SCORE:	**740**

7. Centralized Package Purchase: PRICING

Technology Pricing
(in thousands)

		Assumptions
Modules	$1,200	8 modules at $150,000 per module
Maintenance	180	15% of module costs
Hardware	2,500	hardware cost for enterprise server, development server
Workstations	1,500	planning budget for workstations is $3,000
Other Licences	2,500	Oracle licence for new server, and other licences
Coding Changes	0	no change to the product, tools guys do interfaces
Tech Subtotal	$7,880	

People Pricing
(in thousands)

		Assumptions
Conversion Team	$408	20 interfaces in, 6 weeks each, $70/hr.; 20 interfaces out, 1 week, $70/hr.
Process Change	1,000	initial investment for reengineering and visioning
Product Specialist	2,640	8 contractors, 9 months, $200/hr., plus 10% data conversion
Tools Specialists	990	4 contractors, 9 months, $150/hr., plus 10% data conversion
Additional Resources	726	network people, database administrators
Project Management	908	25% of specialist costs
Expenses	908	20% of personnel costs
People Subtotal	$7,579	

TOTAL COST: $15,459